

## MTH 675 – ASSIGNMENT 1

Due: 10/10/2008

### Problems:

1. Group actions:

(a) Show that the  $k$ -torus defined in class is diffeomorphic to  $T^k = S^1 \times \cdots \times S^1$ .

(b) Show that for  $M = S^n$  and  $G = \{Id, -Id\}$  we get as quotient space the real projective space  $\mathbb{R}P^n$ . Deduce that  $\mathbb{R}P^n$  is orientable for  $n$  odd, and not orientable for  $n$  even.

2. DoCarmo: p. 45-46: 1, 2, 3.

3. Extra credit: DoCarmo: p. 46: 7.